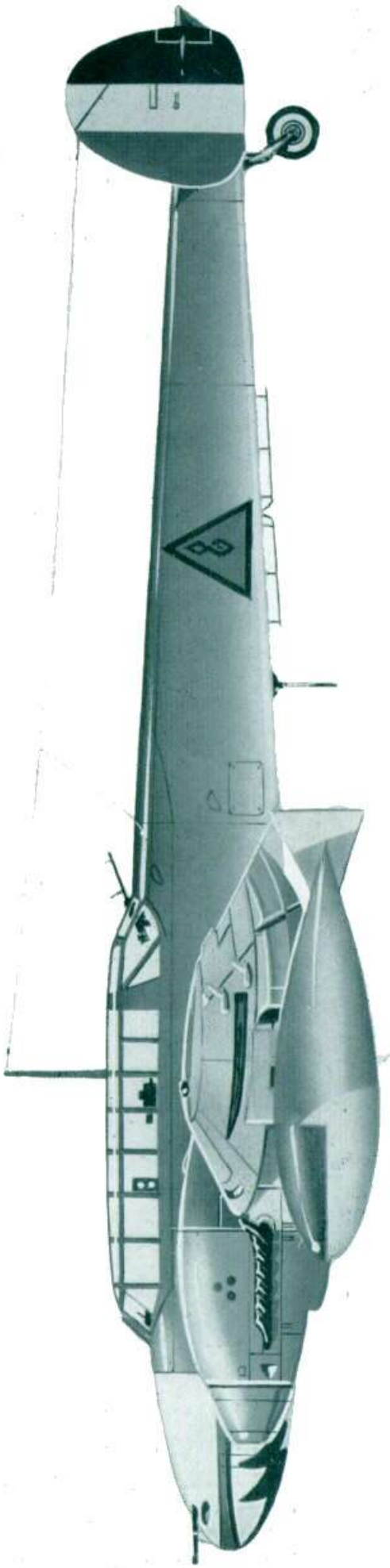
PROFILE PUBLICATIONS

The Messerschmitt Bf 110



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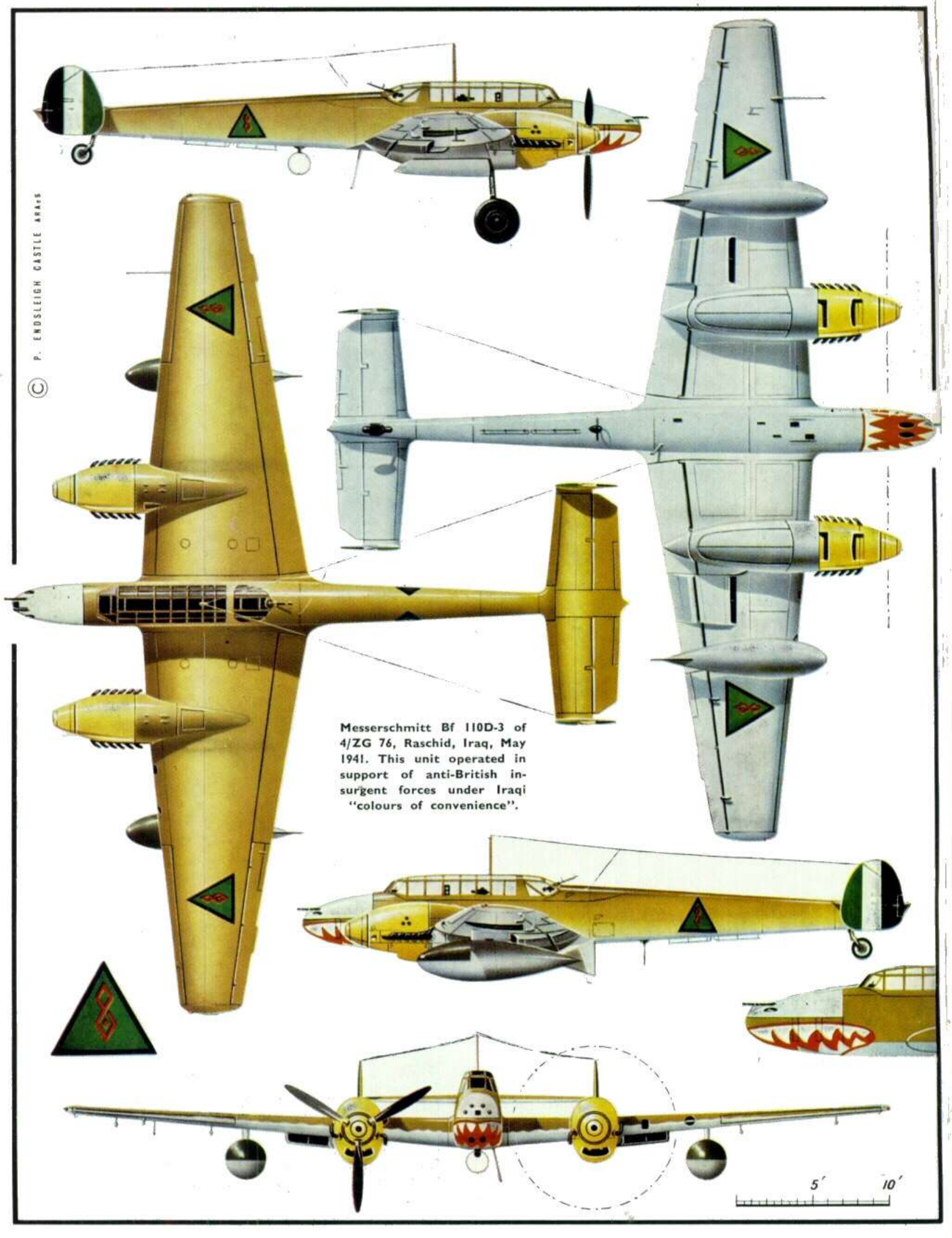


Messerschmitt Bf 110D-3 of 4/ZG 76, Raschid, Iraq, May 1941. This unit operated in support of anti-British insurgent forces under Iraqi "colours of convenience".

The Messerschmitt Bf 110

by Martin C. Windrow

A Messerschmitt Bf 110C-5 (5 F + C M) of the 4th Staffel, Close Reconnaissance Gruppe 14. Note patched bullet-holes in tail and wing roots. (Photo: Imperial War Museum)

The Messerschmitt Bf 110 provides for aero historians the classic example of an aircraft of indifferent quality which was for political and bureaucratic ends hailed with unrealistic enthusiasm by the authorities responsible for its adoption. Consequently, the inevitable failure of the type when exposed to combat was doubly unexpected and humiliating, and many fine airmen were sacrificed on the altar of national pride and political expediency before the counsels of common sense triumphed to any extent.

The strategic fighter, or *zerstörer* as it was melodramatically christened in Germany, was to be an aircraft capable of cutting a path for bomber formations through enemy airspace, eliminating fighter opposition and accompanying the bombers to and from the target, and it is important to bear the essentials of this concept in mind if the full measure of the Bf 110's failure is to be appreciated. Such an aeroplane represents an obvious conflict between the demands of range and manœuvrability; nevertheless, this conception was realised in at least one effective aircraft during World War II—the Lockheed P-38 Lightning which, although not strictly a product of this line of thought, demonstrated a successful solution to comparable problems of range, weight, speed and control response.

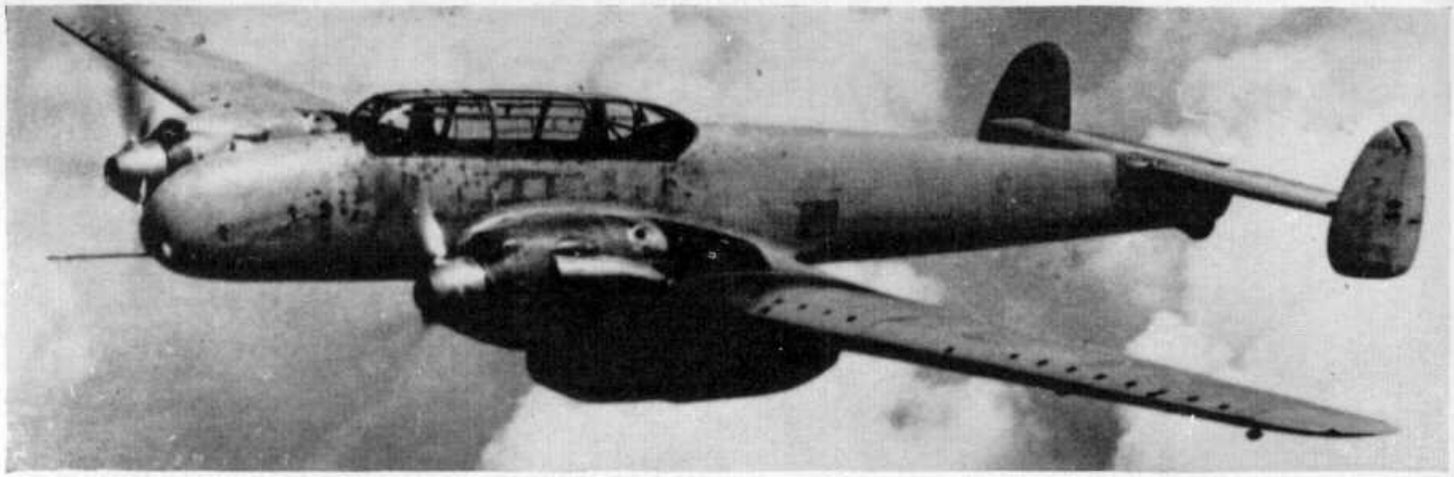
It was inauspicious that the design team to which the *zerstörer* contract was allotted was in all probability never intended to succeed in producing a worthwhile aeroplane. Willy Messerschmitt's office at the *Bayerische Flugzeugwerke* in Augsburg had been out of favour with the Secretary of State for Air, General Erhard Milch, for more than five years before the development contract was placed late in 1934. It seems more than likely that originally Milch and his supporters saw the *zerstörer* theory, which they had accepted with less than unbounded enthusiasm anyway, as a convenient means of destroying Dipl. Ing. Messerschmitt's reputation for good. Similarly, when less prejudiced elements came to power in the Technical Department of the R.L.M., their determination to give the designer a fair hearing may have caused them to turn an indulgent eye on some of the more glaring inadequacies of the aeroplane which eventually emerged from this jungle of petty politics and jealousy.

During the summer of 1935 construction of the Bf 110V1 was begun. It was a slim, low-wing, cantilever monoplane with an attractive, shark-like silhouette, and when two pre-production DB 600 engines of 900 h.p. were earmarked for the prototype by the *Daimler-Benz Aktiengesellschaft*, the designers were relieved of their main problem. Previously, the 610 h.p. Junkers Jumo 210B had been the most potent German powerplant available.

Maiden flight of the Bf 110V1 took place on 12th May 1936; the pilot was Rudolph Opitz, who later played such a part in the development of the Me 163 rocket fighter. The prototype achieved 316 m.p.h. in level flight early in the trials programme, a speed comparable to that of contemporary single-engined fighter projects. The second and third prototypes flew in October and December of 1936, but when the *Luftwaffe* took over the Bf 110V2 for a series of evaluation flights at Rechlin the following January, it quickly became apparent that this satisfactory speed was off-set by extremely poor acceleration and manœuvrability.

Disregarding the reports of the experienced service pilots at Rechlin, the R.L.M. authorised the construction of four more airframes under the designation Bf 110A-0, to be (inadequately) powered by Jumo 210B engines due to a delay in DB 600 production. Two further machines were initially engined with slightly improved Jumo 210Gs at Bf 110B-0s. These airframes, completed in the spring of 1938, were re-engined with DB 600As a year later. In the autumn

The aircraft of II/ZG 76 were emblazoned with "shark's teeth" from the earliest months of the war. This Bf 110C (M 8 + E P) of the 6th Staffel displays its individual letter "E" on the upper wing surfaces, a practice discontinued in the winter of 1940/41. (Photo: Real Photos Ltd.)



The Bf 110V1, first flown in May 1936; the pilot was Rudolph Opitz. (Photo: Imperial War Museum)

of 1938 Bf 110B-1 production commenced. The DB 600A engine was now available, and the B-1, with a nose armament of two 20 mm. MG FF cannon and four MG 17 rifle-calibre machine guns, was undeniably a formidable unit of flying artillery—if its guns could be brought to bear.

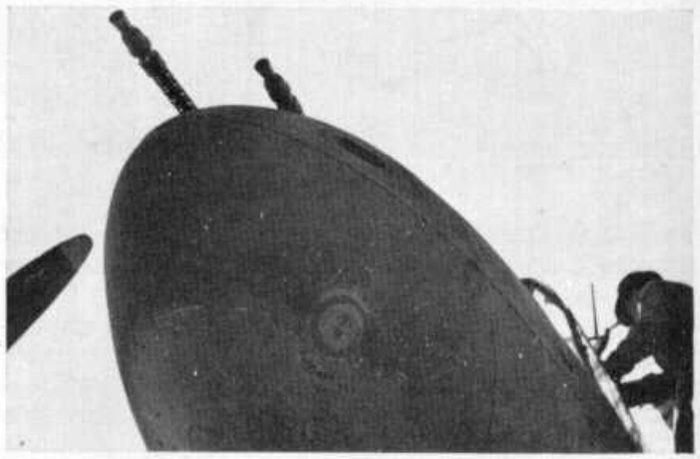
Goering (who was, predictably, an enthusiastic champion of the romantic-sounding *zerstörer* theory) had already instituted—prematurely—the formation of *Zerstörergeschwader*. Like the machine destined to be its weapon and its death-warrant, the organisation was born in bitterness. Of the limited manpower available to the still-young *Luftwaffe*, the majority were fighter pilots, and the Fighter Arm strongly resented seeing its best personnel drained off to equip one new unit after another. In the case of the *Zerstörergeschwader*, this resentment was aggravated when the "stolen cream" of the Fighter Arm, once integrated into the Reichsmarshal's new toy, were in fact equipped with Bf 109Cs and Bf 109Ds while continued attempts were made to perfect the Bf 110. Thus the Bf 110B-1 never saw true *Luftwaffe* service, the few examples built being employed almost exclusively on trials programmes of one type or another. Two results of these trials were the re-positioning of the radiator baths outboard of the engine nacelles and the strengthening of the rear fuselage, to reduce turbulence round the nacelles and tail vibration respectively.

The Bf 110C-0, the next sub-type produced, was the B-1 variant re-engined with the new DB 601 powerplant; this engine had been adopted in preference to the DB 600 because it offered better supercharging and direct fuel injection. It is at this point in the life of the Bf 110 that its career in the true operational configuration began. The Bf 110C-1, essentially a strengthened C-0, is described below.

STRUCTURE OF THE Bf 110

Fuselage: Light alloy monocoque structure, oval section; comprising two halves joining longitudinally along the upper and lower centre-lines. Spar with fuselage between the wing attachment points had tubular steel upper boom and T-section lower boom. Hat-section transverse frames, Z-section stringers, and flush-riveted stressed skin covering.

Wings: All-metal single-spar structure with light alloy stressed-skin flush-riveted covering. The inner wing, containing the self-sealing petrol tanks had no ribs, but closely-spaced inverted hat-section stringers and chordwise stiffeners. The outer wing had light lattice ribs at 18-inch intervals, Z-section stiffeners and hat-section stringers. Slotted, fabric-covered ailerons with external horn-type mass balances. Handley Page-type leading edge slots. Slotted, metal-skinned trailing-edge flaps.



The nose battery of the Bf 110C-5 comprised four MG 17 machine guns. (Photo: Imperial War Museum)

Bf 110Cs of 10/ZG 26 in Sicily. (Photo: Collection R. Ward)

Tail: Light alloy cantilever unit. Twin fins and rudders, adjustable tailplane. Metal stressed-skin fixed surfaces; fabric-covered movable surfaces.

Undercarriage: Backwards-retracting, the main wheels enclosed within the engine-nacelles by hinged doors. Fixed tail-wheel.

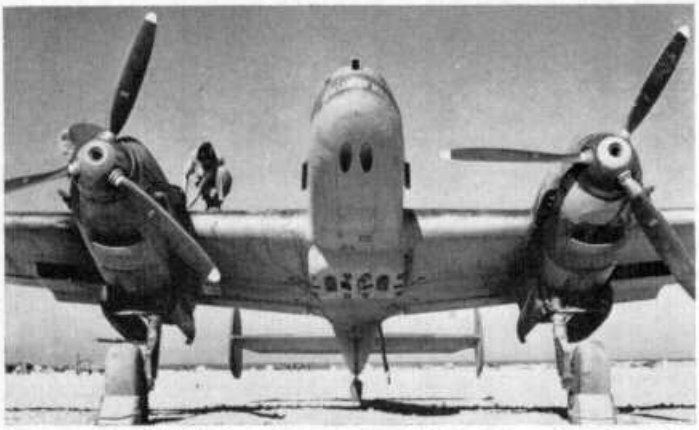
ZERSTÖRER DEVELOPMENT

The further development of the Bf 110 in its day fighter, reconnaissance and ground-attack configurations may be traced through the following variants:

Bf 110C-2. Revised electrical system. New Telefunken *Funke Geräte* (FuG) 10 radio.

Bf 110C-3 and *C-4.* These versions were similar to the C-1 and C-2 apart from their improved MG FF cannon.

An aircraft graveyard in the North African desert. Behind a wrecked Ju 87B/Trop of 5/St.G 5 stands a Bf 110E-1 (3 U + D T) of 9/ZG 26 "Horst Wessel"; W.Nr.2354. (Photo: Imperial War Museum)



"The Belle of Berlin", a damaged Bf 110D-2 abandoned in Libya by the Luftwaffe and reconditioned by the R.A.F. The aircraft retains ETC 500 bomb racks; it probably served with SKG 210 which was based at Tobruk in August 1942. (Photo: Imperial War Museum)

Bf 110C-4/B. Racks for two 550 lb. bombs under fuselage. Powered by 1,200 h.p. DB 601N engines.

Bf 110C-5. Reconnaissance variant. Cannon omitted.

Bf 110C-6. Bomber-interceptor version with additional 30 mm. MK 101 cannon in ventral fairing.

Bf 110C-7. Strengthened undercarriage to allow for carrying of two 1,100 lb. bombs.

(Several late production Bf 110C variants were re-engined with the DB 601N powerplants as they became available.)

Bf 110D-0. The emphasis in the Bf 110D series was on improved range. The pre-production D-0 model dispensed with the MG FF cannon and featured a large faired fuel tank under the forward fuselage. This non-jettisonable supplementary tank brought the total fuel capacity up to 907 Imp. gal., provision being made for two drop-tanks of varying size.

Bf 110D-1. The considerable aerodynamic penalty imposed by the belly fairing of the pre-production model led to the abandonment of the project, and production D-1 versions reverted to the cannon armament while retaining drop-tank capability.

Bf 110D-2. Racks for two 1,100 lb. bombs under fuselage. Rear armament increased to two MG 17s.

Bf 110D-3. Bombs and drop tanks could be carried simultaneously.

Bf 110E-0 and *E-1.* The variants were fitted with racks for two 110 lb. bombs under each wing, outboard of the radiators, in addition to the fuselage racks.

Bf 110E-2. The increased power of the DB 601N engines, which became standard with this version, raised the bomb load capacity to 4,410 lb.

Bf 110E-3. A reconnaissance variant similar to the Bf 110C-5. Two 198 Imp. gal. drop-tanks could be carried.

Bf 110F-0. DB 601F engines rated at 1,300 h.p. Apart from this change, the *F-0*, *F-1* and *F-3* variants were similar respectively to the *E-0*, *E-1* and *E-3*.

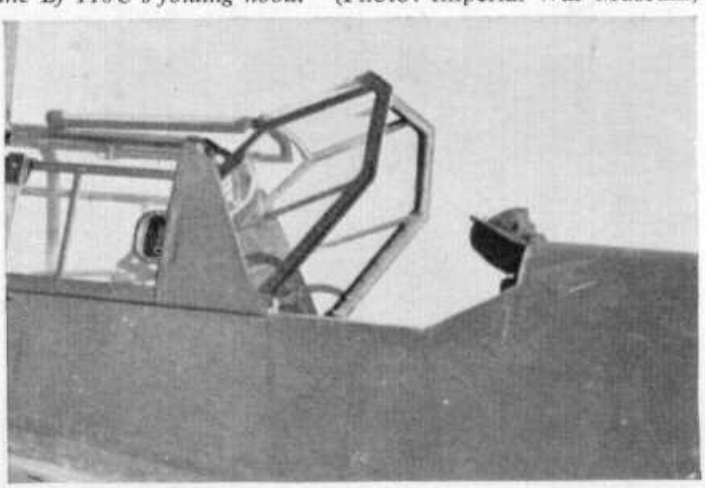
Bf 110F-2. Bomber-interceptor with provision for two 21 cm.WG 21 "Dodel" rocket tubes under each wing.

Bf 110G-0. The introduction of the 1,475 h.p. DB 605B engines allowed an increase in weights and thus in war load. The *G-0* and *G-1* variants could carry two 1,100 lb. and four 110 lb. bombs and any of a wide variety of combinations of 550 lb., 1,100 lb., 2,205 lb., and 110 lb. general-purpose, high penetration or fragmentation bombs and incendiary containers.

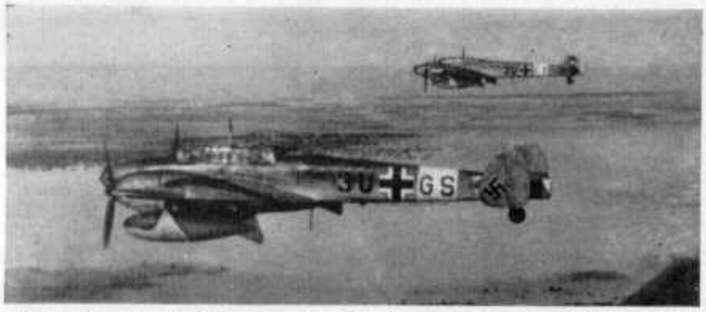
Bf 110G-2. This variant saw the introduction of a number of improvements. The MG FF cannon were replaced by two faster-firing MG 151s, and a further two MG 151s could be carried in a ventral tray in place of the bomb racks. The rear armament was increased to twin 7·9 mm. MG 81s. Other changes included strengthened oleo legs, a re-set fin and enlarged rudder surfaces, and modifications to the ignition systems, engine bearers and oil tankage.

**Bf 110G-2/R1.* MG 151s and fuselage bomb racks

The unusual method of access to the rear cockpit was modified on late Bf 110 variants, a side-hinging canopy section replacing the Bf 110C's folding hood. (Photo: Imperial War Museum)



*Rüstsatz, *meaning the complete kit of parts necessary for modifying an aircraft to a special configuration.*



Bf 110Ds of 8/ZG 26 and 9/ZG 26 over North Africa. Note the finned 198 Imp. gal. drop tanks.

discarded to accommodate faired 37 mm. BK 3.7 (Flak 18) cannon under centre section.

Bf 110G-2/R2. Similar to *G-2/R1*, with GM-1 engine boost (nitrous oxide injection) and no rear armament.

Bf 110G-2/R3. MG 81s re-installed; forward-firing battery of two MK 108 and four MG 151 cannon. Fuselage bomb racks discarded to accommodate ventral installation of two MG 151s.

Bf 110G-2/R4. Forward-firing armament two MK 108s, one Flak 18 cannon.

Bf 110G-2/R5. Similar to *G-2/R4* with no rear armament. GM-1.

Bf 110G-3. Long range reconnaissance variant. Forward-firing armament decreased to four MG 17s. One Rb 75/30 camera and one Rb 50/30 camera. Rear armament increased to twin MG 81s and one fixed MG 151 cannon. No bomb racks.

Bf 110G-3/R3. Similar to *G-3*; MG 17s replaced by two MK 108s.

Bf 110H-2. First H-series variant to reach production. Similar to *G-2*; retractable tail-wheel.

Gf 110H-2/R1. Similar to *G-2/R4*; extra armour protection for Flak 18 ammunition stowage.

Bf 110H-2/R2. Similar to *H-2/R1*, with GM-1.

Bf 110H-3. Long range reconnaissance variant. Similar to G-3 apart from nose battery of two MK 108s.

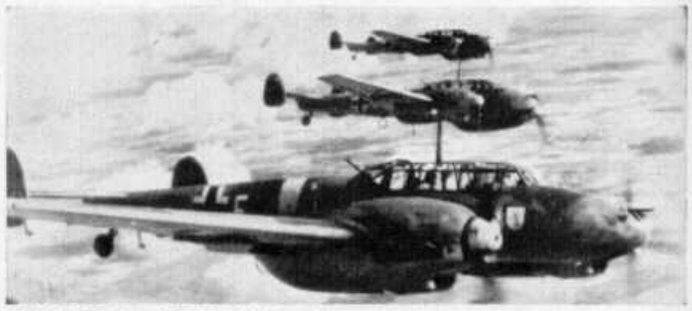
Minor variants included the Bf 110C-1/U1 glider-tug, converted from early C-1 fighter models; and the C-2/U1 test-bed for the remote-control gun barbettes of the Messerschmitt Me 210 series.

NIGHT FIGHTER DEVELOPMENT

The various Bf 110 night fighter models evolved as a parallel but separate line of development. Progress in this field may be traced through the following variants:

Bf 110F-4. The first Bf 110 night fighter. Powered by DB 601F engines of 1,300 h.p. and carrying two 30 mm. MK 108 cannon in a ventral tray in addition to standard armament, the F-4 was employed on

Luftwaffe personnel prepare a Bf 110D of III/ZG 26 for a night sortie in North Africa



Bf 110F-1s of SKG 210 in formation.
(Photo: Collection R. Ward)

G.C.I. operations. It was also the first variant to carry three crew members.

Bf 110G-4. Powered by two 1,475 h.p. DB 605B engines, this type carried forward-firing armament comprising four MG 17s and two MG 151s. Twin MG 81s were mounted in the rear of the cockpit and FuG 212 radar was installed. The forward fuselage was more heavily armoured than previously. Two 66 or 198 Imp. gal. drop-tanks could be carried; provision for bomb armament was two 550 lb. racks under the fuselage and two 110 lb. racks under each wing (if drop-tanks were not carried).

Bf 110G-4/U7. No rear armament. The GM-1 booster, of 968 lb. capacity and 45 minutes' duration, was fitted to this version. FuG 212.

Bf 110G-4/U8. Fuselage bomb racks omitted. No rear armament. Third crew member's position occupied by 119 Imp. gal. fuel tank. FuG 212.

Bf 110G-4/R3. Twin MG 81 re-installed in rear cockpit. Fuselage and wing bomb racks. Forward-firing armament improved by replacement of MG 17 battery by two MK 108s. FuG 212.

Bf 110G-4/R6. No rear armament. GM-1 installed. FuG 212.

Bf 110G-4/R7. Similar to *G-4/R3* except for lack of rear armament and installation of 119 Imp. gal. fuel tank in third crew member's position. FuG 212.

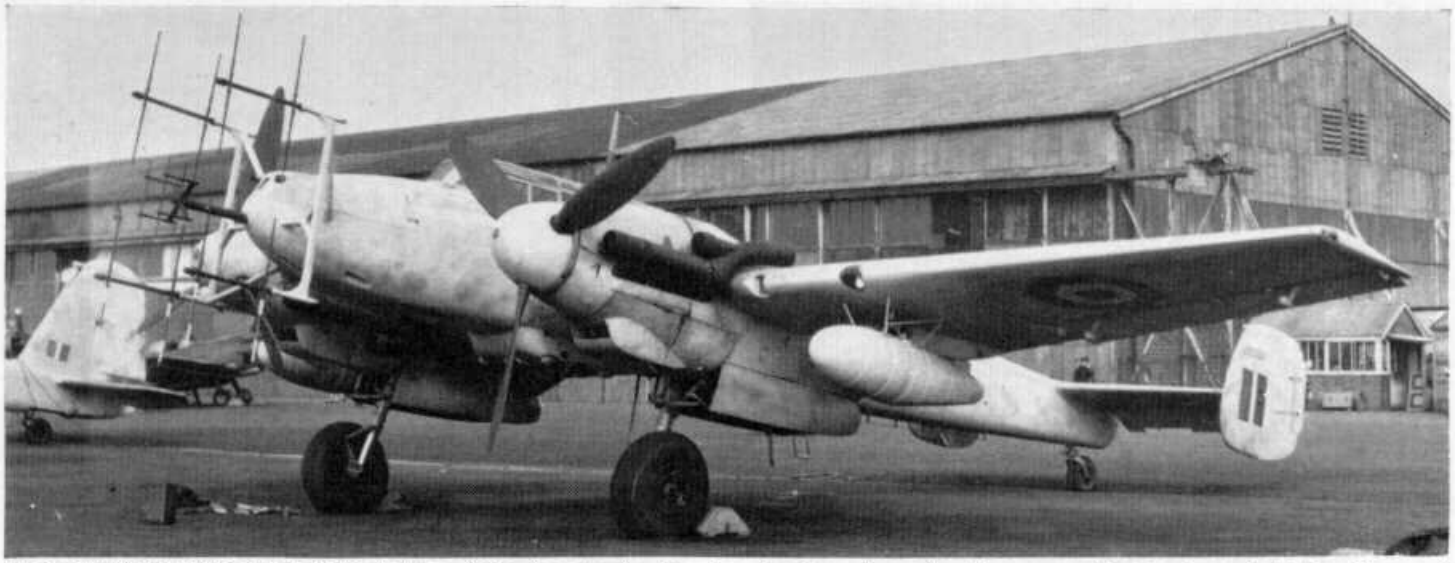
Bf 110H-4. Twin MG 81 re-installed. Optional fuselage and wing bomb racks. Forward-firing armament. of four MG 17s, two MG 151s and two additional MG 151s in ventral tray if fuselage bomb racks were omitted. Improved armour protection for crew. FuG 212.

Bf 110H-4/U7. Similar to *H-4*, with GM-1 booster.

Bf 110H-4/U8. No GM-1; 119 Imp. gal. fuel tank in third crew member's position. FuG 212.

Bf 110G and Bf 110H-4 night fighters often carried both FuG 212 and FuG 220 radar arrays; the rapidly changing demands for radio aids and counter

Adjusting the camera of a Bf 110 reconnaissance aircraft in the Western Desert. (Photo: Collection R. Ward)



A captured Bf 110G-4/R7 night fighter. Note drop tanks, fuselage bomb racks and radar array. (Photo: Imperial War Museum)

measures in the final year of the war make a rigid tabulation of the radar carried by night fighter variants impossible.

THE Bf 110 IN SERVICE

It had been intended to test the Bf 110B-1 under operational conditions in the Spanish Civil War, but that conflict ended before the *zerstörer* was ready, and the Bf 110 fired its guns in anger for the first time in Poland. Almost exclusively engaged on ground support operations during this "Eighteen Day War", the Bf 110 faced no realistic fighter opposition. As far as is known, the Bf 110 first exchanged shots with the Royal Air Force on 18th December 1939, when a force of 22 Wellington bombers attacking shipping of Wilhelmshaven were intercepted by elements of III/JG 77, equipped with Bf 109Es and Bf 110Cs believed to have been attached to JG 1. Against the unescorted bombers the Bf 110s acquitted themselves well, a Hptm. Falk, later a night fighter ace, destroying two Wellingtons and damaging a third in this action.

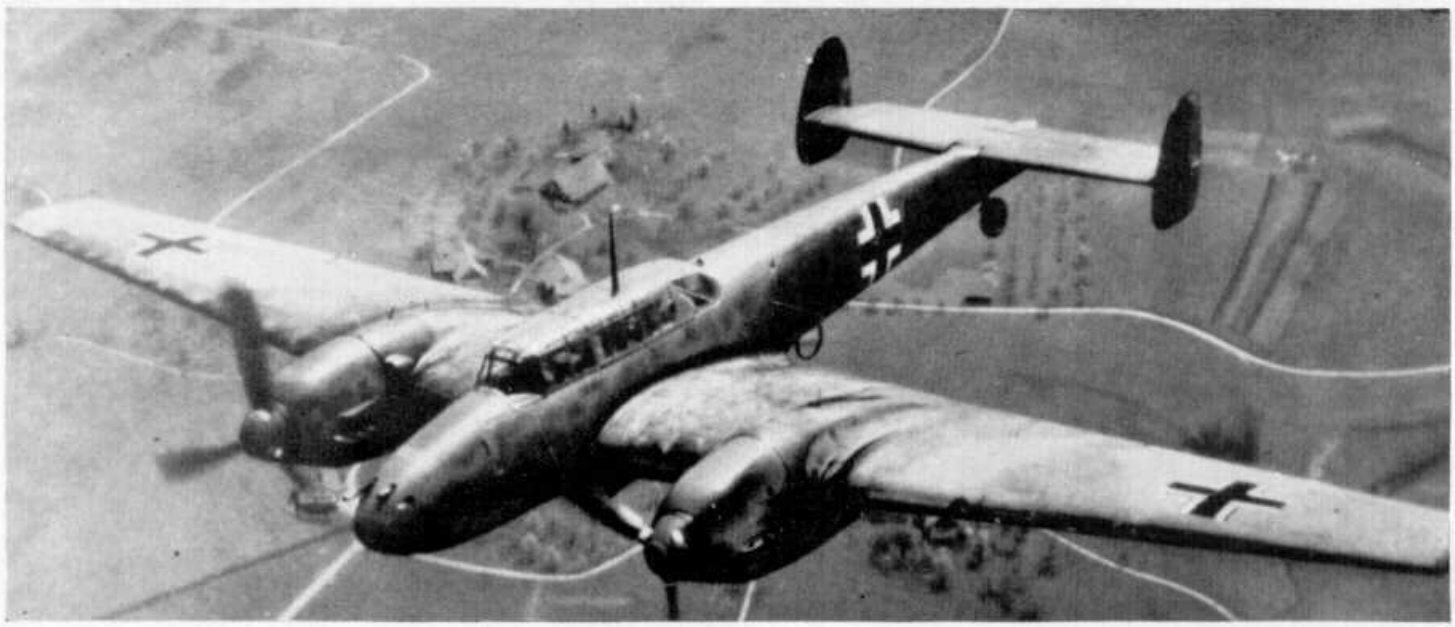
When *Operation Weserübung*, the German invasion of Norway, was launched on 8th April 1940, the fighter strength of the *Luftwaffe* component included II/ZG 76. Fighter opposition was minimal, and apart from one or two sharp skirmishes with the Gladiators of 263 Squadron R.A.F. over Bodo the Bf 110s may be said to have won another "walk-over".

During the invasion of France and the Netherlands in the spring of 1940 some 350 Bf 110C-1s were on the strength of *Luftflotten* 1 and 3. For the first time the *zerstörer* units were opposed by a vigorous, if outgunned, fighter defence and losses were higher than had been anticipated. When attacks on Channel shipping led the Bf 110 into its first equal combats with R.A.F. Spitfires and Hurricanes, the loss statistics began to alarm certain *Luftwaffe* officers who placed more reliance upon known facts than upon their own propaganda.

The Battle of Britain began in earnest in July/August 1940, and some 220 Bf 110C-1s were committed to the campaign. The units involved were two *Gruppen* of ZG 2; three *Gruppen* of ZG 26 "*Horst Wessel*"; two *Gruppen* of ZG 76; and one *Gruppe* of *Lehrgeschwader 1*, an operational training wing. In September *Erprobungsgruppe* 210, an experimental unit which operated Bf 110s alongside Bf 109Cs and Me 210s, joined the battle and thus launched the Bf 110 on its career as a fighter-bomber.

The Bf 110 displayed in the great air battles over Kent and Sussex all the shortcomings which had been built into it, and the *zerstörer* dream was shattered at last. It was easily identifiable from long distances; its acceleration and speed were insufficient to allow it the

A Bf 110 in flight during manufacturers' trials. The rear guns have not been fitted and the aircraft bears a radio call-sign code on the fuselage sides. (Photo: Collection R. Ward)



The MG 81Z (Zwilling-Twin) machine gun, standard late model defensive armament. (Photo: J. L. E. Maskall)

A pilot of 7/ZG 26 changes sun helmet for flying helmet before a desert flight. (Photo: Collection R. Ward)

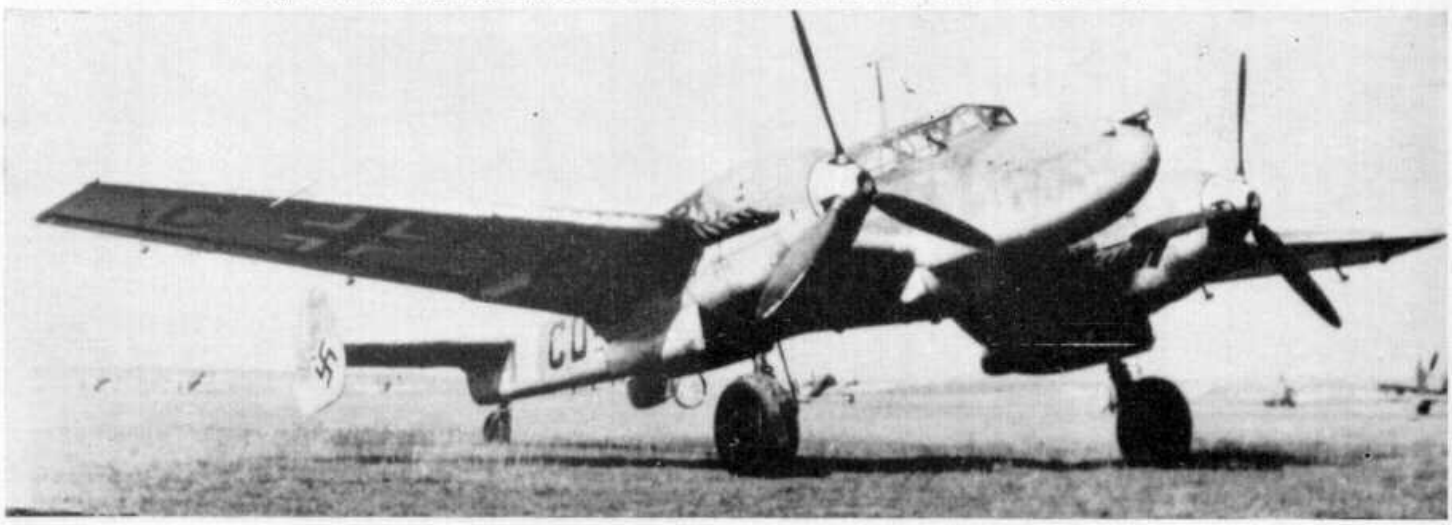
luxury of avoiding combat; it was sluggish in evasive manœuvres; its turning circle was wide, and with its large wing and tail surfaces it presented a good target. The single rear gun was inadequate as a defensive weapon, and the formidable battery of nose guns was useless if the Messerschmitt was trying to rid itself of fighters attacking from the rear, as was so often the case. The "destroyer" became the "destroyed"; the strategic fighters which were to have carved a path for the avenging *Kampfgeschwader* through the Spitfires and Hurricanes were reduced to forming defensive circles and waiting for the overworked Bf 109Es to extract them from their perilous position.

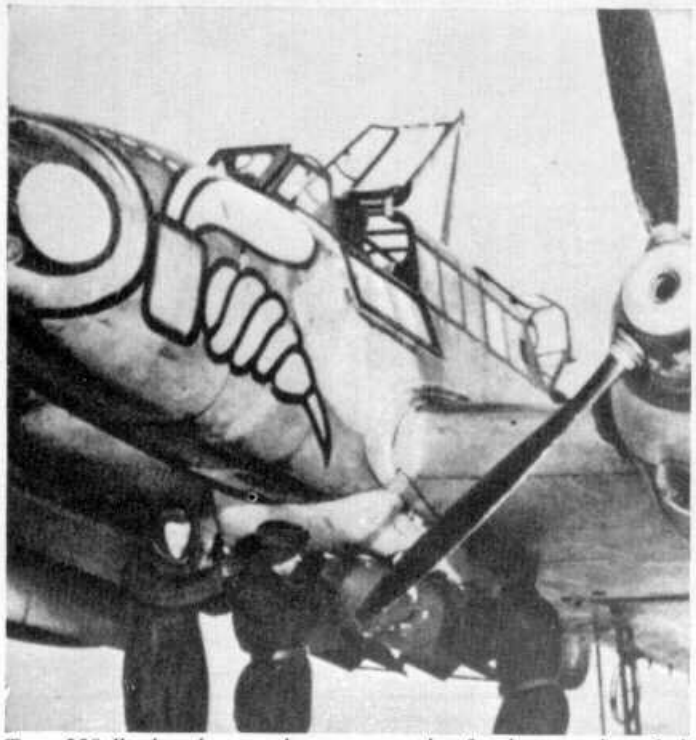
Early in 1941 the mauled *Zerstörergeschwader* were withdrawn from first-line service in Europe. ZG 26 was disbanded and reformed; *Erprobungsgruppe* 210 became *Schnelles Kampfgeschwader* 210. Reconnaissance and ground support duties were allotted to the ex-*élite* fighter units, and they were dispersed over other fronts where it was hoped they would not encounter first-class fighter opposition. The Bf 110C, Bf 110D, Bf 110E and Bf 110F series served in a variety of rôles in the Balkans, Finland, Russia, North Africa and Southern Europe, mainly as "twin-engined Stukas". In Iraq, II/ZG 76, the "*Haifisch Gruppe*", were painted in rough Iraqi Air Force markings and operated in support of the insurgents who threatened the R.A.F. base at Habbaniyah. Two Messerschmitts masquerading in this fashion were destroyed at Raschid airfield on 17th May 1941 by Sgt. Smith and Sgt. Dunwoodie of 94 Squadron R.A.F., flying Gladiators.

The last pure *Zerstörer* formations, ZG 76 and the reformed ZG 26 "*Horst Wessel*", were used as interceptor units during the daylight operations over Germany of the 8th U.S.A.A.F. The range and heavy armament of the Bf 110 were invaluable in these actions, and a variety of rocket weapons were tested against the huge formations of B-17s and B-24s. Naturally, the survival of the Bf 110 interceptors depended on their avoiding the attentions of the Allied escort fighters, but even when forced to remain out of range of the American formations they were of use as "shadow" planes, relaying information ahead to single-engined fighter forces. The Bf 110 *staffeln* were heavily committed as interceptors during the aerial slaughters of 17th August 1943, the day of the great Schweinfurt-Regensburg raids.

Vulnerable during the daylight hours, the Bf 110 was an obvious choice when the *Luftwaffe* began the expansion of night fighter defences in 1940/41. The 1st Night Fighter Division, which actually only consisted of three *Gruppen* drawn from survivors of *Zerstörer* units, was founded in Holland late in 1940. Two years later, largely due to the energy of *Luftwaffe* General Josef Kammhuber, this force had grown to

The Bf 110C-4/B was one of the most widely used variants in the first three years of the war.





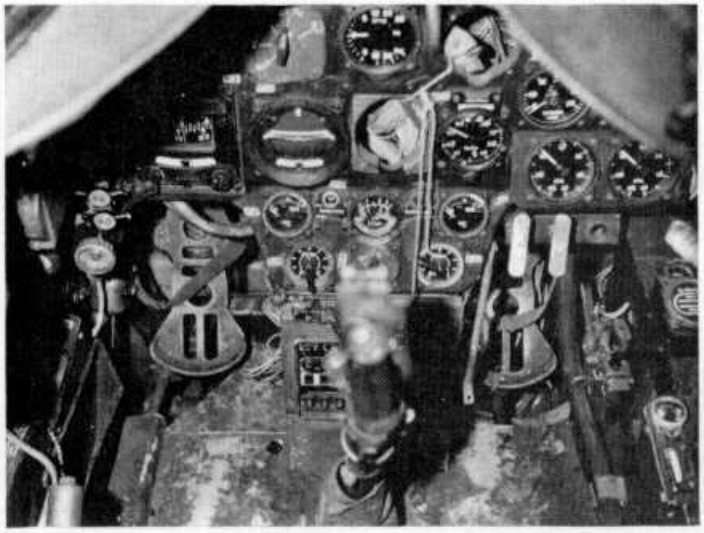
Two 550-lb. bombs can be seen on the fuselage racks of this white-painted Bf 110 of ZG 1 in Russia.
(Photo: Collection R. Ward)

six (albeit under-strength) *Geschwader*. By the end of that year the first properly co-ordinated G.C.I. radar service had been set up, based on the control bunkers at Arnheim, Döberitz, Metz, Schleissheim and Stade. Previously the night fighters had been largely dependent upon pre-arranged co-ordination with searchlight batteries. By March 1943, the *Nachtjagdgeschwader* had attained a high degree of efficiency, claiming some 1,600 R.A.F. night bombers destroyed. These claims are the more impressive when one considers that the Night Fighter Arm seldom exceeded 350 pilots, and that the Bf 110 night fighter was a death-trap if crucially damaged. Vast quantities of fuel were carried, and abandoning the aircraft was virtually impossible for at least one member of the crew. The radar-operator, cramped in the centre of the narrow cockpit on a seat which consisted of a tubular metal frame covered with a square of cord netting, could only leave or enter the aircraft through the gunner's hatch. If the gunner was killed or injured, the radar operator was completely trapped. It was physically impossible for a man in flying clothes to crawl over or round the gunner and open the cockpit. It was hard enough to get in when the aircraft was standing on the tarmac.

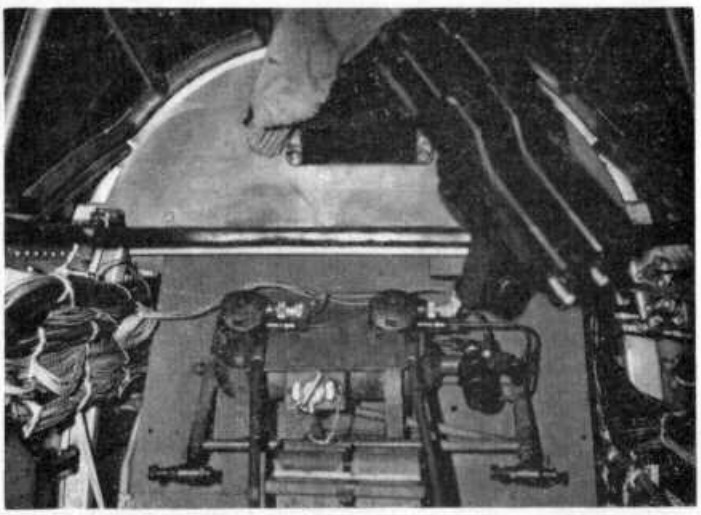
Two factors began to reduce the high level of effectiveness of the Night Fighter Arm in the spring and early summer of 1943. The crews and aircraft of the *Nachtjagdgeschwader* were ordered into the air by day to help the day fighters in their struggle against the 8th Army Air Force. This increased the strain on men and machines, and losses rose due to night fighter pilots, accustomed to the cover of darkness, pressing home lone-wolf attacks too vigorously by day.

It was also in this period that the "radio war" of radar counter-measures began in earnest; and until

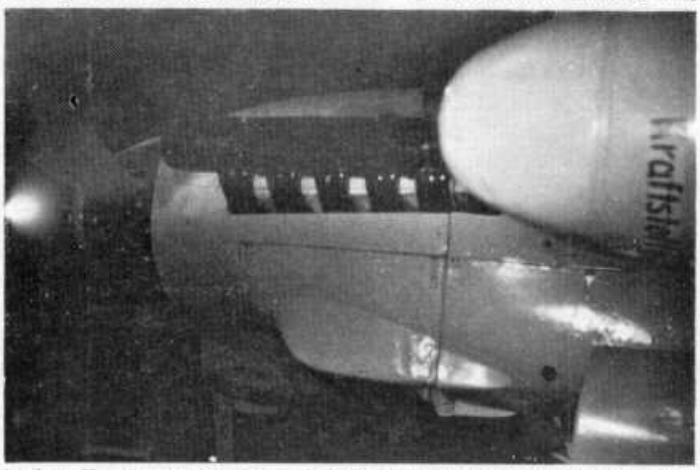
Cockpit of the Bf 110G-4/R3 night fighter.
(Photo: J. L. E. Maskall)



Gunner's position in the Bf 110G-4/R3, with MG 81Z machine guns. (Photo: J. L. E Maskall)



The DB 605B engine which powered Bf 110G night fighters. Note special exhaust shrouds. (Photo: J. L. E. Maskall)



Luftwaffe armourers feeding belts of 7·9 mm. ammunition into the nose magazines of a Sicily-based Bf 110D before a mission over Crete. (Photo: Collection R. Ward)

Bf 110s of Schlachtgeschwader 1 dispersed in a Russian clearing. The two nearest machines, A 5 + E B and A 5 + H B, are aircraft of the 1st Gruppe staff flight. The yellow belly-band near the tail indicates service in the North and Central Russian zones. The under wing-tips were also painted yellow.

the end of the war the record of the night fighters was subject to sharp fluctuations as the British and German scientists fought out their own long range war with such exotically named weapons as "Ground Grocer", *Lichtenstein*, *Neptun*, "Piperack", *Flensburg*, "Serrate" and *Naxos*.

LUFTWAFFE UNITS AND MARKINGS

The basic *Luftwaffe* tactical unit was the *Geschwader*. The units which employed the Bf 110 series of aircraft were named *Zerstörergeschwader* (Destroyer Wings), *Schnelles Kampfgeschwader* (Fast Bomber Wings), *Nachtjagdgeschwader* (Night Fighter Wings) or *Aufklärungsgruppen* (Reconnaissance Squadrons). Other types of units flew the Bf 110 for specialised tasks or as communications or "hack" machines at one time or another, but the majority of the machines produced were assigned to the above-mentioned types of formation.

Each *Geschwader* was made up of a number of *Gruppen*, each of which was in turn made up of three *Staffeln*. These sub-units were numbered indepen-

(continued on back page)

On a Russian airfield, a snow-camouflaged Bf 110 starts a minor blizzard with its slipstream. The wasp motif of ZG1 "Wespen Geschwader" can just be seen on the nose.
(Photo: Collection R. Ward)

SPECIFICATION
Bf 110C-4
Two-seat Day Fighter

Dimensions: Span 53 ft. 4⅞ in.; length 39 ft. 8½ in.; height 11 ft. 6 in.; wing area 413 sq. ft.

Powerplants: Two 1,100 h.p. Daimler-Benz DB 601A twelve-cylinder inverted Vee liquid-cooled engines; V.D.M. three-blade controllable-pitch airscrews.

Armament: Four 7·9 mm. MG 17 machine guns with 1,000 rounds per gun in upper half of nose. Two 20 mm. MG FF cannon with 180 r.p.g. in lower half of nose. One rearward-firing 7·9 mm. MG 15 machine gun with 750 r.p.g. in cockpit.

Weights: Normal loaded 15,300 lb.

Fuel Tankage: 279 Imp. gal. in wing cells.

Performance: Maximum speeds—349 m.p.h. at 22,965 ft.; 294 m.p.h. at sea level. Maximum cruising speeds—301 m.p.h. at 22,965 ft.; 263 m.p.h. at sea level. Range on 279 Imp. gal.—481 miles at 262 m.p.h. at sea level; 528 miles at 304 m.p.h. at 16,400 ft.; 565 miles at 301 m.p.h. at 22,965 ft.; operational ceiling 32,000 ft.

SPECIFICATION
Bf 110G-4/R3
Three-seat Night Fighter

Dimensions: Span 53 ft. 4⅞ in.; length 41 ft. 6¼ in.; height 13 ft. 1¼ in.; wing area 413 sq. ft.

Powerplants: Two 1,475 h.p. Daimler-Benz DB 605B twelve-cylinder inverted Vee liquid-cooled engines; V.D.M. three-blade airscrews.

Armament: Two 30 mm. MK 108 cannon with 135 rounds per gun in upper half of nose. Two 20 mm. MG 151 cannon with 300 and 350 r.p.g. respectively in lower half of nose. Two rearward-firing 7·9 mm. MG 81 machine guns in twin mounting with 400 r.p.g. in cockpit. (Alternative cockpit armament was the "Shräge Musik" installation of twin 20 mm. MG FF cannon mounted to fire obliquely upward from the rear cockpit bulkhead.) Bomb load 1,540 lb.

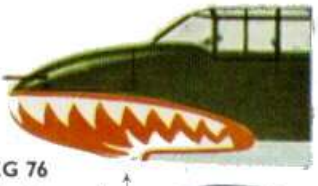
Weights: Empty 11,220 lb.; normal loaded 20,700 lb.; maximum loaded 21,800 lb.

Fuel Tankage: 279 Imp. gal. in wing cells; two 198 or 66 Imp. gal. drop tanks.

Performance: Maximum speeds—342 m.p.h. at 22,965 ft.; 311 m.p.h. at sea level. Range on 675 Imp. gal.—1,305 miles. Operational ceiling 26,000 ft. Maximum climb rate—2,306 ft./min. to 18,000 ft.

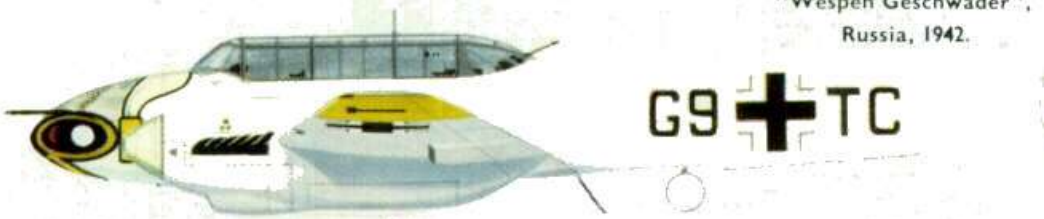
Bf 110 production: By 31st December 1939, approx. 573 machines had been delivered. Subsequent production totalled: *1940* 1,083 machines; *1941* 784 machines; *1942* 580 machines; *1943* 1,580 machines; *1944* 1,525 machines. Between 1st January 1945 and the cessation of hostilities, 45 machines were produced.

Bf 110C of 6/ZG 76, Sicily, 1941.



II/ZG 76
"Haifisch Gruppe"

Bf 110D of Staff II/ZG 1
"Wespen Geschwader",
Russia, 1942.



ZG 1 "Wespen Geschwader"

Bf 110C of 2/NJG 4, Germany, 1942.

NJG 1, 2, 3, 4, 6
"Der Englandblitz"

Bf 110D of Staff I/NJG 1, Western Desert 1942–3.
Note non-standard codes.

I St.NJG 1.

Bf 110C of Staff I/ZG 76, Aalborg, Denmark, 1940.

I/ZG 76.

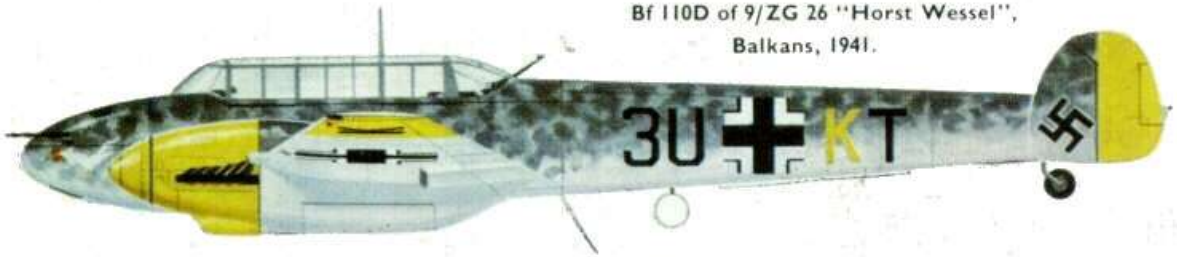
Bf 110C of 7/ZG 26 "Horst Wessel",
Western Desert, 1942–3.

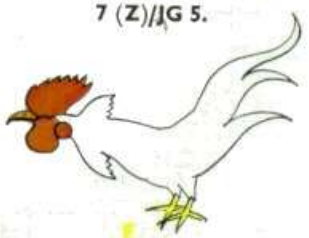
7/ZG 26 "Horst Wessel"

Bf 110C of 7(Z)/JG 5, Norway, 1940.

7 (Z)/JG 5.

Bf 110D of 9/ZG 26 "Horst Wessel",
Balkans, 1941.



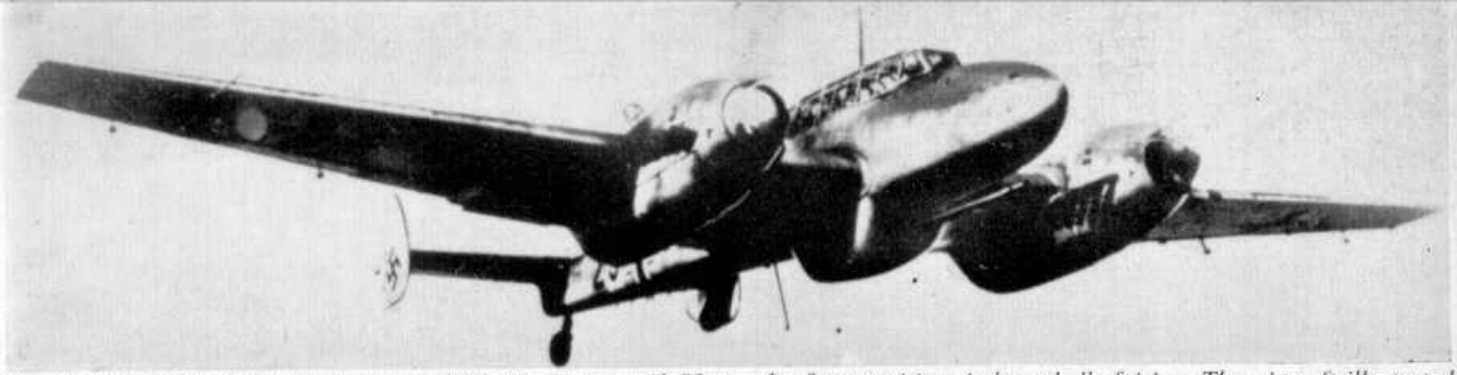


9/ZG 26 "Horst Wessel"

Bf 110C of 1/ZG 76, Poland, 1939–40.

I St. ZG 76
"Locomotivstaffel"

© WARD



The Bf 110G-2/R4 mounted one 37 mm. Flak 18 cannon, with 72 rounds of ammunition, in large belly fairing. The aircraft illustrated was operated by ZG 1.

dently (see organisation table below); thus, for instance, II/ZG 26 (the second *Gruppe* of *Zerstörergeschwader* 26 "*Horst Wessel*") was made up of 4/ZG 26, 5/ZG 26 and 6/ZG 26 (the fourth, fifth and sixth *Staffeln* of ZG 26).

The operational strengths of these formations varied greatly; but an average *Staffel* mustered between ten and 16 aircraft, thus giving a *Geschwader* an establishment of some 90 to 120 machines. Unfavourable loss/replacement ratios often rendered these "paper strengths" very inaccurate.

All *Luftwaffe* operational units except *Jagdgeschwader* (Fighter Wings) and some *Schlachtgeschwader* (Ground Attack Wings) used a four-symbol code on the fuselage sides of aircraft for identification purposes. On the left-hand side of the national insignia on each side of the machine appeared a numeral/letter code identifying the *Geschwader*, e.g., 2 S = ZG 2; and F 1 = KG 76 (Bomber Wing No. 76). From 1943 onwards this code tended to be painted in very small characters by some units, or omitted altogether. In the case of *Nachtjagdgeschwader* unit codes and even national insignia were often considered superfluous and were obscured by sprayed camouflage finishes.

On the right-hand side of the national insignia two letters appeared. The first was the identification letter of the individual machine, and was painted or outlined in the *Staffel* colour (see organisation table below). This practice was abandoned by NJGs late in the war. The second letter identified the *Staffel* within the *Geschwader* in accordance with a rigid schedule which applied throughout the war (see table).

Various combinations of this four-symbol code were marked on the wings. Early in the war, all four symbols were often applied to wing undersurfaces. It was observed that the individual and *Staffel* letters were sometimes painted outboard of the national insignia under starboard and port wingtips respectively. In the Battle of Britain several types of German aircraft, notably Bf 110s and Dornier Do 17s, carried the individual letter outboard of the national insignia on the wing upper surfaces. Probably the most common practice, however, was the repetition of the individual letter in black under both wing tips.

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THE STRUCTURE OF THE GESCHWADER

Staffel Colour	I Gruppe	II Gr.	III Gr.	IV Gr.	V Gr.
White ...	1st Stfl. = H	4th Stfl. = M	7th Stfl. = R	10th Stfl. = U	13th Stfl. = X
Red	2nd Stfl. = K	5th Stfl. = N	8th Stfl. = S	11th Stfl. = V	14th Stfl. = Y
Yellow ...	3rd Stfl. = L	6th Stfl. = P	9th Stfl. = T	12th Stfl. = W	15th Stfl. = Z

Each *Geschwader* and *Gruppe* had a Staff Flight, varying in size but always marked in accordance with the following schedule. The Flight colour was green, and the appropriate letter replaced the fourth, or *Staffel*, symbol.

Geschwader Staff = A	III Gr. = D
I Gruppe = B	IV Gr. = E
II Gr. = C	V Gr. = F

Thus, 2 S + (white E) R was machine "E" of 7/ZG 2; R 4 + TW was machine "T" of 12/NJG 2; and M 8 + (green L) D was machine "L" of *Gruppe Stab*/III/ZG 76.

Two important exceptions to the above should be noted. Reconnaissance units were organised around the *Gruppe* rather than the *Geschwader*. Consequently, the *Aufklärungsgruppen* often mustered up to six *Staffeln*, and the individual letter immediately to the right of the national insignia on the fuselage sides was not coloured. The *Gruppen* were coded as if they were *Geschwader* for identification purposes, being allotted two-symbol codes. Thus, 5 F + C M was machine "C" of Reconnaissance Squadron 14's 4th *Staffel*.

(See photograph on page 3 of this *Profile*.)

When engaged on bomber-interceptor operations towards the end of the war, ZG 76 applied fighter-style markings to their Bf 110s. The four-symbol code was either abandoned or supplemented by fighter identification numbers of one or two digits, and staff aircraft were marked with the various chevron/bar symbols employed by *Jagdgeschwader* staff flights.

Units known to have operated the Bf 110 during their service include:

ZG 1 (6 U, later G 9, later 2 J); ZG 2 (2S); 6/ and 7/(Z)JG 5 "*Eismeer Geschwader*" (LN); 10/ and 13/(Z) JG 5 (1 B); ZG 26 "*Horst Wessel*" (U 8 until 30th June 1941, later 3 U); ZG 76 (M 8); E.Gr. (later SKG) 210 (S 9); LG 1 (L 1); LG 2 (L2); Aufkl.Gr.(H)14 (5 F); Aufkl.Gr.(F)33 (8 H); NJG 1 (G 9); NJG 2 (R 4); NJG 3 (D 5); NJG 4 (3 C, later G 9); NJG 6 (3 C until 30th July 1943, later 2 Z); St.G 1 (A 5).

It will be noted that certain *Staffeln* of the *Zerstörer* element of JG 5 "*Eismeer Geschwader*" did not conform to the usual pattern of *Geschwader* codes; it will also be seen that owing to the disbandment and reformation of several units, the code G9 was carried by three distinct *Geschwader* at various times.

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